<div align="center">**REMARKS**</div>

Claims 1-6, 8-19, 21-31, and 33-38 are all the claims presently pending in the application.

The amendments herein, if any, are made only to more particularly point out the invention for the Examiner and not for narrowing the scope of the claims or for any reason related to a statutory requirement for patentability.

Applicants also note that, notwithstanding any claim amendments herein or later during prosecution, Applicants' intent is to encompass equivalents of all claim elements.

Applicants understand that the previous rejection under 35 U.S.C. § 101 has been withdrawn, since the Examiner does not repeat it in the latest Office Action.

Claims 1-6, 8, 9, 12-19, 21, 22, 25-31, 33, 34, 37, and 38 stand rejected either under 35 U.S.C. § 102(b) as anticipated by "PetroSPIRE: A multi-modal content-based retrieval system for petroleum applications" by Bergman et al., or under 35 U.S.C. §103(a) as unpatentable over the Bergman, further in view of "Comparing Texture Feature Sets for Retrieving Core Images in Petroleum Application" by Li et al. Claims 10, 11, 23, 24, 35, and 36 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Bergman/Li, further in view of "A Framework for Mining Sequence Database at Multiple Abstraction Levels" by Yu.

These rejections are respectfully traversed in the following discussion.

I.   THE CLAIMED INVENTION

An exemplary embodiment of the claimed invention, as defined by, for example, independent claim 1, is directed to a method for storing a semantic object derived from geological seismic survey data. The method includes <u>summarizing attributes of the semantic object, indexing the summary of attributes, and storing the summary of attributes and the index of the summary of attributes</u>. The summary of attributes includes one of a slice label, a signal strength, and a coordinate of a surveyed segment.

Conventionally geological seismic survey data has been visualized to assist geologists in tasks, such as for constructing three dimensional reservoir models. This data may be used to directly create images that may be viewed. These images may be annotated and saved.

However, the amount of this seismic survey data is very large and it is very difficult to search and analyze the data in order to identify seismic regions that have geological characteristics which are interesting to geologists. Such enormous amounts of data make it very difficult for a geologist to identify features in the geology that is being visualized.

Additionally, the amount of data that is collected has so far outpaced the ability for conventional systems to store the data.

In stark contrast, the present invention provides a <u>semantic object</u> from geological seismic survey data and then <u>summarizes, indexes, and stores attributes of the semantic object</u>. In this manner, the geological seismic survey data may be analyzed much more efficiently and easily.

II.   THE PRIOR ART REJECTIONS

A.   The Bergman et al. reference

Regarding the rejection of claims 1-6, 8-9, 12-19, 21-22, 25-31, 33-34, 37 and 38, the Examiner alleges that the Bergman et al. reference teaches the claimed invention. Applicants submit, however, that there are elements of the claimed invention which are neither taught nor suggested by the Bergman et al. reference, since this reference clearly fails to summarize and index the semantic objects that are described.

That is, it appears that the Examiner fails to recognize that, even if Bergman demonstrates the <u>identification</u> of semantic objects, there is no suggestion to <u>then summarize these semantic objects</u> and index the summary of attributes.

As explained beginning at line 12 of page 10, the present invention clearly describes using PetroSPIRE as one exemplary mechanism for deriving the semantic objects for geologic raw data. This is the <u>same tool/method described in Bergman</u>.

The present invention <u>goes beyond simply finding the semantic objects</u> that PetroSPIRE is capable of identifying from raw geologic data by <u>summarizing attributes of these objects</u> and then <u>building and storing an index for the summaries, along with the summaries</u>.

Bergman does not suggest <u>summarizing</u> these objects, let along developing an index of such summaries. That is, the description beginning at line 3 on page 452 can reasonably be

described as the process of analyzing raw data to <u>locate</u> geologic semantic objects. This is further developed in the discussion in section 5.1.1, wherein features are identified using queries of the raw data, which are, in turn, further abstracted to assign labels. As explained in section 5.1.2, queries are formulated in terms of objects, either simple or composite. As clearly explained in section 5.3.1, under the subtitle "semantic object extraction", Bergman considers that <u>extraction of semantic objects would be straightforward to implement</u>, but this feature was <u>not implemented</u> for purpose of that article.

     Therefore, Applicants again submit that, <u>if this feature to extract semantic objects is not even implemented</u>, then there are <u>no semantic objects in Bergman that would be subject to be summarized</u>.

     In the rejection, the Examiner points to various descriptions, including Figure 4(a). However, Figure 4(a) shows a section of <u>raw data</u> that has been identified after providing an improved definition of shale.

     This improvement in the process of <u>identifying features</u> is <u>not</u> equivalent to extracting semantic objects from the raw data, since the semantic objects involve a <u>higher level of abstraction</u> above features, and Bergman clearly states that the capability of locating the higher-level semantic objects has <u>not even been implemented,</u> even though it would have been straightforward to do so.

     The present invention clearly provides an <u>even higher level of abstraction</u> above the extraction of semantic objects, by providing a summary of attributes of extracted semantic objects, along with an index of the summary. Therefore, whatever the Examiner considers the raw data presentations and the description of enhanced identification capability in Bergman to be, it does <u>not</u> include <u>semantic objects</u>. As noted, Bergman <u>itself clearly describes that these features are NOT equivalent to semantic objects</u>, since the capability of semantic object extraction had <u>not even been implemented</u> for purpose of that article.

     Therefore, Applicants again submit that Bergman fails to satisfy the plain meaning of the claim language of the independent claims relative to a "semantic object." Indeed, Bergman even concedes that the <u>capability of determining semantic objects has <i>not even been incorporated</i></u>, as clearly described at lines 22-25 on page 457: "*Semantic object extraction. Semantic object*

extraction (as part of data ingest) has not been incorporated into the current scenario. Since the SPIRE framework supports object pre-extraction, however, we will describe this facility here. Incorporating this into the PetroSPIRE application, would be very straightforward, and we anticipate doing so in the near future."

Applicants, therefore, again submit that, <u>if the capability to extract semantic objects is not even present</u> in Bergman, then this reference <u>clearly fails to suggest the summarization and indexing of semantic objects</u>, as required by the independent claims.

In the rejection, the Examiner relies upon the description at the bottom of page 457 related to "Feature Extraction." However, feature extraction is <u>not equivalent</u> to "semantic object extraction", as clearly evidenced by the description in Bergman itself that feature extraction has been implemented in their system, as described in this final paragraph on page 457, whereas the capability of semantic object extraction has <u>not</u> been incorporated into their system. Therefore, Bergman itself considers feature extraction to be something other than extraction of semantic objects.

Again, Applicants submit that without the capability of extracting semantic object, as that concept is understood in the art and expressly described as being absent in Bergman itself, there can clearly be no summarization and indexing of semantic objects, as required by the independent claims.

The Examiner relies upon secondary reference Li for reasons unrelated to overcoming this fundamental deficiency of Bergman, so that Li does not compensate for this deficiency.

Hence, turning to the clear language of the claims, in Bergman there is no teaching or suggestion of: "A method for storing a <u>semantic object</u> derived from geological seismic survey data, the method comprising: <u>summarizing attributes of said semantic object</u>; indexing <u>the summary of attributes</u>; and <u>storing the summary of attributes and the index of the summary of attributes</u>, wherein said summary of attributes comprises one of a slice label, a signal strength, and a coordinate of a surveyed segment", as required by independent claim 1. The remaining independent claims have similar wording.

Therefore, the Bergman et al. reference does not teach or suggest each and every element of the claimed invention and the Examiner is respectfully requested to withdraw this rejection of

claims 1-9, 12-22, 25-34, and 37.

B.   The Bergman et al. reference in view of the Li et al. reference

Regarding the rejection of claims 1-6, 8-9, 12-19, 21-22, 25-31, 33-34, and 37, the Examiner alleges that the Li would have been combined with the Bergman to form the claimed invention. Applicants submit, however, that these references would not have been combined and, even if combined, the combination would not teach or suggest each and every element of the claimed invention, since secondary reference Li fails to overcome the fundamental deficiency identified above that Bergman fails to even incorporate the feature of identifying semantic objects, let alone the capability of summarizing and indexing them.

Therefore, the Examiner is respectfully requested to withdraw the rejection of claims 1-6, 8-9, 12-19, 21-22, 25-31, 33-34, 37, and 38.

C.   The rejection based on Bergman/Li , further in view of Yu

Applicants note that, regardless of the propriety of modifying Bergman/Li with secondary reference Yu, the underlying deficiency in Bergman of failing to identify semantic objects, let alone summarizing and indexing them, precludes this combination from meeting the initial burden of a prima facie rejection for these dependent claims.

Therefore, the Examiner is respectfully requested to withdraw the rejection of claims 10-11, 23-24, and 35-36.

IV.   FORMAL MATTERS AND CONCLUSION

In view of the foregoing amendments and remarks, Applicants respectfully submit that claims 1-6, 8-19, 21-31, and 33-38, all the claims presently pending in the Application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the Application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

  The Commissioner is hereby authorized to charge any deficiency in fees or to credit any
overpayment in fees to Attorney's Deposit Account No. 50-0510.

         Respectfully Submitted,

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